

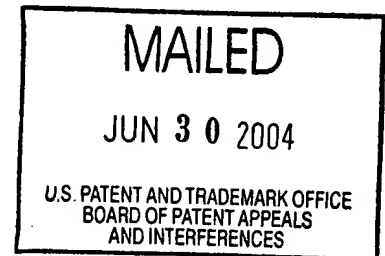
UNITED STATES PATENT AND TRADEMARK OFFICE

**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Ex parte JOHN G. FREED

Appeal No. 2003-0581
Application No. 09/035,944

ON BRIEF



Before FLEMING, BARRY, and BLANKENSHIP, *Administrative Patent Judges*.

BARRY, *Administrative Patent Judge*.

DECISION ON APPEAL

A patent examiner rejected claims 1-24. The appellant appeals therefrom under 35 U.S.C. § 134(a). We affirm.

BACKGROUND

The invention at issue on appeal is aimed at improving the dynamic range of a Code Division Multiple Access ("CDMA") receiver in the presence of a narrowband, interfering signal. (Spec. at 1.) CDMA is a well-known, widely deployed protocol for radio frequency ("RF") voice and data communication; it uses spread spectrum technology to spread the energy of a transmission over a wide bandwidth. Use of the

protocol can increase channel capacity, reduce susceptibility to multipath fading, increase communication security, and lower power consumption. (Appeal Br. at 2.)

According to the appellant, however, the wide bandwidth of a CDMA system increases its susceptibility to interference from narrowband signals, e.g., those from the Advanced Mobile Phone System ("AMPS"). An AMPS signal in or near the frequencies of a CDMA system can introduce a "crossmodulation" noise component into the input signal seen at a CDMA receiver. By raising the noise floor of the input signal, the crossmodulation reduces the dynamic range of the receiver. (*Id.* at 2-3.)

Third order non-linearity in the receiver's Low Noise Amplifier ("LNA") contributes to the reduction of the dynamic range. Accordingly, some LNAs allow adjustment of their third order Input Intercept Point ("IIP3"). The IIP3 is a characteristic extrapolated from a plot of an output RF signal and third-order crossmodulation noise versus an input RF signal. As the input RF signal is increased, the IIP3 is the point where the desired output RF signal and the crossmodulation noise become equal in amplitude. Because the magnitude of the crossmodulation noise is related to the strength of both the wideband CDMA transmission and the AMPS interfering signal, explains the appellant, a conventional solution to the problem of range reduction has been to increase the IIP3 when a CDMA transmitter operates at high power, and to reduce the

IIP3 when the transmitter operates at low power. Although this solution can increase the dynamic range of the receiver sometimes, he adds, it does not address the situation wherein a mobile user near a CDMA base station uses a transmitter at a low power level in the presence of a strong, interfering AMPS signal. Then, the appellant explains, the low IIP3 of the LNA, which has been set based on the low transmitting power, cannot suppress the crossmodulation noise, which degrades the received signal. (*Id.* at 3.)

In contrast, the appellant's invention adjusts the IIP3 of a CDMA receiver's LNA based not only on the operating power of the transmitter, but also on a detected error rate. With this approach, asserts the appellant, the receiver may more accurately tune the IIP3 to maximize the dynamic range of the receiver in the presence of a narrowband, interfering signal. (*Id.*)

A further understanding of the invention can be achieved by reading the following claim.

15. A method for improving the dynamic range of a receiver, the method comprising the steps of:

computing an error rate of a received signal; and

adjusting an input intercept point of a low noise amplifier in the receiver, depending on the computed error rate.

Claims 1-24 stand rejected under 35 U.S.C. § 103(a) as obvious U.S. Patent No. 6,134,430 ("Younis") and U.S. Patent No. 5,758,271 ("Rich").

OPINION

"[T]o assure separate review by the Board of individual claims within each group of claims subject to a common ground of rejection, an appellant's brief to the Board must contain a clear statement for each rejection: (a) asserting that the patentability of claims within the group of claims subject to this rejection do not stand or fall together, and (b) identifying which individual claim or claims within the group are separately patentable and the reasons why the examiner's rejection should not be sustained." *In re McDaniel*, 293 F.3d 1379, 1383, 63 USPQ2d 1462, 1465 (Fed. Cir. 2002) (citing 37 C.F.R. §1.192(c)(7) (2001)). "If the brief fails to meet either requirement, the Board is free to select a single claim from each group of claims subject to a common ground of rejection as representative of all claims in that group and to decide the appeal of that rejection based solely on the selected representative claim." *Id.*, 63 USPQ2d at 1465.

Here, the appellant stipulates, "[c]laims 1-24 should be grouped together. All of the claims stand or fall together." (Appeal Br. at 5.) We select claim 15 from the group as representative of the claims therein. With this representation in mind, rather than

reiterate the positions of the examiner or the appellant *in toto*, we focus on the following points of contention therebetween:

- analogousness of Rich
- motivation to combine Younis and Rich
- combined teachings of Younis and Rich.

A. ANALOGOUSNESS OF RICH

The examiner finds, "Rich discloses . . . computing an error rate of a received signal (col 6 lines 26-34). . . ." (Final Rejection¹ at 2.) The appellant argues, "the proposition that one of ordinary skill in the art, facing the problem confronting the Appellant at the time of invention, would be led to Rich to begin with, is a dubious one." (Appeal Br. at 10.)

Whether a prior art "is 'analogous' art [i]s a question of fact. . . ." *Jurgens v. McKasy*, 927 F.2d 1552, 1558, 18 USPQ2d 1031, 1036 (Fed. Cir. 1991) (citing *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1568 n.9, 1 USPQ2d 1593, 1597 n.9 (Fed. Cir. 1987)). Two criteria have evolved for answering the question: "(1) whether the art is from the same field of endeavor, regardless of the problem addressed, and (2) if the reference is not within the field of the inventor's endeavor, whether the reference still is

¹"We advise the examiner to copy his rejections into his examiner's answers," *Ex parte Metcalf*, 67 USPQ2d 1633, 1635 n.1 (Bd.Pat.App.& Int. 2003), rather than merely referring to a "rejection . . . set forth in prior Office Action. . . ." (Examiner's Answer at 3.)

reasonably pertinent to the particular problem with which the inventor is involved." *In re Clay*, 966 F.2d 656, 658-59, 23 USPQ2d 1058, 1060 (Fed. Cir. 1992) (citing *In re Deminski*, 796 F.2d 436, 442, 230 USPQ 313, 315 (Fed. Cir. 1986); *In re Wood*, 599 F.2d 1032, 1036, 202 USPQ 171, 174 (CCPA 1979)).

Regarding the first criterion, the appellant's invention is from the field of RF receivers. (Spec. at 1.) Rich is also from the field of "radio frequency (RF) receivers. . . ." Col. 1, ll. 9-10. Because the inventions of the appellant and the reference are both from the field of RF receivers, we find that Rich is analogous art.

B. MOTIVATION TO COMBINE YOUNIS AND RICH

The examiner finds, "Younis specifically states that the IIP is adjusted based on a comparison between a measured RSSI value and an RSSI threshold, the threshold being adjusted based on an error rate." (Examiner's Answer at 6.) The appellant argues, "neither of the references provides any suggestion or motivation for combination with the other. . . ." (Appeal Br. at 6.)

"The presence or absence of a motivation to combine references in an obviousness determination is a pure question of fact." *In re Gartside*, 203 F.3d 1305, 1316, 53 USPQ2d 1769, 1776 (Fed. Cir. 2000) (citing *In re Dembiczak*, 175 F.3d 994,

1000, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999). "[T]he question is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination." *In re Beattie*, 974 F.2d 1309, 1311-12, 24 USPQ2d 1040, 1042 (Fed. Cir. 1992) (quoting *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1462, 221 USPQ 481, 488 (Fed. Cir. 1984)). "[E]vidence of a suggestion, teaching, or motivation to combine may flow from the prior art references themselves, the knowledge of one of ordinary skill in the art, or, in some cases, from the nature of the problem to be solved. . . ." *Dembiczak*, 175 F.3d at 999, 50 USPQ2d at 1617 (citing *Pro-Mold & Tool Co. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573, 37 USPQ2d 1626, 1630 (Fed. Cir. 1996); *Para-Ordnance Mfg. v. SGS Importers Int'l, Inc.*, 73 F.3d 1085, 1088, 37 USPQ2d 1237, 1240 (Fed. Cir. 1995)).

Here, we find that evidence to combine flows from the references themselves. Younis discloses a "programmable dynamic range receiver," col. 1, l. 10, which includes a "low noise amplifier (LNA) 1220b. . . ." Col. 7, ll. 3-4. "[T]he IIP3 of the . . . LNA 1220b . . . [is] adjusted in accordance with the measured non-linearity in the output signal from receiver 1200." Col. 12, ll. 13-16. "[T]he non-linearity is measured by the RSSI slope method," *id.* at l. 17, and "compared against a predetermined RSSI threshold." *Id.* at ll. 62-63. "The RSSI threshold can be adjusted during operation of

receiver 1200 based on the required bit-error-rate (BER). . . . performance." Col. 12, l. 66 - col. 13, l. 2.

Although Younis adjusts the IIP3 of its LNA based on an error rate, it does not detail how the error rate is computed. Emphasizing that its "invention is not intended to be limited to the [disclosed] embodiments," col. 24, ll. 39-40, however, the reference recognizes that "various modifications to these embodiments will be readily apparent to those skilled in the art, and the generic principles defined herein may be applied to other embodiments. . . ." *Id.* at ll. 35-38. We find that the omission of detail and the recognition of modifications and alternative embodiments invites the use of known techniques of computing an error rate.

For its part, Rich discloses a known technique of computing an error rate. To wit, a "signal quality determininer [sic] 111 can comprise an error rate estimator for estimating an error rate of . . . processed signal 128 (shown as hatched lines into the signal quality determiner 111)." Col. 6, ll. 29-34. "The error rate derived from the processed signal 128 is a bit error rate." *Id.* at ll. 36-37. The reference's signal quality determiner is used to "optimiz[e] the quality of a received signal in a radio receiver." Col. 1, ll. 11-12.

Because Younis invites the use of known techniques of computing an error rate, and Rich discloses a technique that optimizes the quality of a received signal in a radio receiver, we are persuaded that the references would have suggested employing Rich's technique of computing an error rate in Younis' programmable dynamic range receiver.

C. COMBINED TEACHINGS OF YOUNIS AND RICH

The examiner finds, "Younis further discloses that the use of a specifically low-noise amplifier (LNA) with an adjustable IIP is an improvement for such a system, stating that adjusting the IIP of the amplifier 'minimizes degradation in the performance of receiver 1200', see col 12 lines 1-4. . . ." (Examiner's Answer at 5.) The appellant argues, "the combination still would not yield the present invention, wherein the variable gain and variable IIP₃ of an LNA are controlled independently by a Digital Signal Processor (DSP)." (Appeal Br. at 12.)

In addressing the point of contention, the Board conducts a two-step analysis. First, we construe the representative claim at issue to determine its scope. Second, we determine whether the construed claim would have been obvious.

1. Claim Construction

"Analysis begins with a key legal question -- *what* is the invention *claimed*?" *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1567, 1 USPQ2d 1593, 1597 (Fed. Cir. 1987). In answering the question, "the Board must give claims their broadest reasonable construction. . . ." *In re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1668 (Fed. Cir. 2000). "Moreover, limitations are not to be read into the claims from the specification." *In re Van Geuns*, 988 F.2d 1181, 1184, 26 USPQ2d 1057, 1059 (Fed. Cir. 1993) (citing *In re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989)).

Here, claim 15 recites in pertinent part the following limitations: "adjusting an input intercept point of a low noise amplifier in the receiver, depending on the computed error rate." Contrary to the appellant's argument, the claim neither requires a DSP nor control of the variable gain of an LNA. Giving the claim its broadest, reasonable construction, the limitations require adjusting the IIP3 of an LNA based on a computed error rate.

2. Obviousness Determination

Having determined what subject matter is being claimed, the next inquiry is whether the subject matter would have been obvious. The question of obviousness is

"based on underlying factual determinations including . . . what th[e] prior art teaches explicitly and inherently. . . ." *In re Zurko*, 258 F.3d 1379, 1383-84, 59 USPQ2d 1693, 1696 (Fed. Cir. 2001) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966); *In re Dembiczak*, 175 F.3d 994, 998, 50 USPQ 1614, 1616 (Fed. Cir. 1999); *In re Napier*, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed. Cir. 1995)). "A *prima facie* case of obviousness is established when the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art." *In re Bell*, 991 F.2d 781, 783, 26 USPQ2d 1529, 1531 (Fed. Cir. 1993) (quoting *In re Rinehart*, 531 F.2d 1048, 1051, 189 USPQ 143, 147 (CCPA 1976)).


Here, as explained regarding the prior point of contention, we found that Younis teaches adjusting the IIP3 of its LNA based on an error rate and that Rich teaches a technique of computing an error rate. When the teachings from the prior art itself were combined, we are persuaded that the combination would have suggested adjusting the IIP3 of an LNA based on a computed error rate. Therefore, we affirm the obviousness rejection of claim 15 and of claims 1-14 and 16-24, which fall therewith.

CONCLUSION

In summary, the rejection of claims 1-24 under § 103(a) is affirmed. "Any arguments or authorities not included in the brief will be refused consideration by the Board of Patent Appeals and Interferences. . . ." 37 C.F.R. § 1.192(a). Accordingly, our affirmance is based only on the arguments made in the brief. Any arguments or authorities omitted therefrom are neither before us nor at issue but are considered waived. *Cf. In re Watts*, 354 F.3d 1362, 1367, 69 USPQ2d 1453, 1457 (Fed. Cir. 2004) ("[I]t is important that the applicant challenging a decision not be permitted to raise arguments on appeal that were not presented to the Board.") No time for taking any action connected with this appeal may be extended under 37 C.F.R. § 1.136(a).

Much RFB

~~LANCE LEONARD BARRY~~
Administrative Patent Judge


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Howard B. Blankenship

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